

REMARKS

Claims 1-7 are pending in the present application. Claims 1-4 are herein amended. New claims 5-7 have been added. No new matter has been presented.

Rejections under 35 USC §102(b)

Claims 1, 2 and 4 were rejected under 35 USC §102(b) as being anticipated by Bijvoets (U.S. Patent No. 5,006,178).

Claim 1, as amended, recites as follows:

A cooling device, comprising:

- a first electrode to contact with an electronic component to be cooled;
- a second electrode;
- a thermoelectric conversion material disposed between the first electrode and the second electrode;
- an electric conductor directly connecting the first electrode and the second electrode making the first electrode and the second electrode electrically short-circuited.

The Examiner alleged as follows:

Regarding claims 1 and 4, BIJVOETS discloses a thermoelectric device that can be utilized for cooling (Col. 3, lines 56-58), wherein is taught a device comprising a thermoelectric conversion material (6 & 7, Figure) between two electrodes that function as a cathode and an anode (two terminal ends of 5, Figure) which are implicitly electrically short-circuited (Col. 3, lines 60-64), so that one electrode side in contact with the thermoelectric conversion material becomes a low-temperature side and the other electrode side becomes a high-temperature side as evident with the presence of a temperature difference (AT) across the device (Col. 3, lines 56-58; Col. 4, lines 7-10; Col. 5, lines 11-15),

(Office Action, pages 2 to 3). However, even assuming, *arguendo*, that the bridges 5 correspond to the first electrode and the second electrode, the two bridges 5 are connected only by two semiconducting end pieces 8 or 10 and an intermediate piece 9, as shown in the drawing of Bijvoets, bridges 5. Thus, there is no “electric conductor directly connecting the first electrode and the second electrode making the first electrode and the second electrode electrically short-circuited.”

What Bijvoets discloses is an improvement of conventional Peltier element, which is explained in the present specification at page 2, line 21 to page 3, line 2. It is clear that the Peltier element disclosed in Bijvoets requires electric power in order to be used as a cooling device (see Bijvoets, column 5, lines 29-36). It is well known that a conventional Peltier element has a metal electrode to which p-type semiconductor and n-type semiconductor are connected in a Π shape and that direct current electric power is provided.

In contrast, the present invention does not require electric power supply. Also, it does not necessarily require a p-n connection. The thermoelectric conversion material can be either one of p-type or of n-type. Also, p-type semiconductor and n-type semiconductor can be alternately connected in series. These are not expected from the disclosure of Bijvoets.

For at least these reasons, claim 1 patentably distinguishes over Bijvoets. Claims 2 and 4, depending from claim 1, also patentably distinguish over Bijvoets for at least the same reasons.

Rejections under 35 USC §103(a)

Claim 3 was rejected under 35 USC §103(a) as being obvious over Bijvoets (U.S. Patent No. 5,006,178) in view of Muramatsu et al. (U.S. Patent No. 6,326,610 B1).

Claim 3 depending from claim 1, also patentably distinguishes over Bijvoets for at least the same reasons.

Muramatsu et al. has been cited for allegedly disclosing Peltier device for cooling wherein two cooling devices are stacked. However, such disclosure of Muramatsu et al. does not remedy the deficiencies of Bijvoets.

For at least these reasons, claim 3 patentably distinguishes over Bijvoets and Muramatsu et al.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

Application No. 10/540,523
Art Unit: 1795

Amendment under 37 C.F.R. §1.111
Attorney Docket No. 052668

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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